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passes over a notch in the tip of the drill shaft (Fig. 5, f). In fire making, one man holds the bed while another pumps the drill up and down with both hands. No pressure is applied to the upper end of the drill shaft. The time required to produce a spark is about the same as with the ordinary drill. Pump fire drills are also used by the Sihanaka and probably by other tribes, but they are nowhere common. 372

At the present time flint and steel is by far the commonest fire making appliance throughout Madagascar. The Tanala say that the historic clans, as distinct from the aborigines, have always used it. The striker is shaped somewhat like an adze blade, the narrow upper end being bent down over the back to form a grip (Fig. 4, d1). A variety of stones is used: flint, chalcedony, jasper and even quartz crystal. The tinder is made from charred cotton or cotton cloth. It is carried in the tip of a horn, the open end being provided with a tight stopper of gourd shell (Fig. 4, d3). The entire outfit is usually carried in a small box of wood or rawhide, in a horn, or in a hollow hide belt. Tinder horns and belts are used by all the Madagascar tribes, but the wooden tinder boxes appear to be limited to the Tanala. Nearly all of them are manufactured by the Zafimaniry division, which trades them to the neighboring clans. At least 80 per cent of the boxes conform to a single pattern (Fig. 5, b). The body has a long oval section, with flat, squarely cut ends. It is hollowed from a single block of rather soft, light colored wood which exhibits a beautiful curling grain. The bottom, in the form of a long pointed oval, is made separately and inset, being held in place by pins of wood, bone or horn. It is usually of red wood. The cover is made from a moderately hard red wood and fits closely over a sort of sleeve or projection, so that the joint is almost watertight. Its outer surface is flush with the body. It is surmounted by a comb, the width of the flat ends of the box, which is notched along the upper edge. Holes are pierced horizontally through the ends of the body a short distance below the lid and through the base of the comb near either end. A long cord passing through these holds the cover on and also serves for suspension. In a second and much rarer type one side of the box is flat and the other convex (Fig. 5, c). The lid may have a low comb along the flat side, but usually has a low flange running across the flat side and extending forward for a short distance on the curved side, at either end. A single double box of this type was collected and a modification in which the body of the box was crescent shaped in section was seen. In a third type, which 372 415 [438]

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325 135 It seems probable that the Tanala were ignorant of its value, if not of its existence, until they were instructed by foreign traders. A few abandoned gold workings have been found by prospectors, and one or two caches of gold dust, but there is no way of determining their age.

325 439 Copper is still almost unknown, the only objects in use being a few bracelets obtained from the Betsileo. Brass, in the form of ornamental knife hilts and bracelets, is used by the Ikongo. They do not manufacture these articles, but buy them from the Bara, who are clever brass casters. The metal itself is of European origin and most of the knife hilts are made from old cartridge shells melted down.

135 326 438 The most important iron deposits are in the territory of the Tanala Ikongo. There are also deposits in the territory of the Zafimaniry, among the Menabe. There are a great number of smiths in this gens and they formerly carried on a regular trade in metal and finished implements with their neighbors. No account of Ikongo iron working was obtained, but their methods probably are the same as those of the Zafimaniry.

325 The ore used by the Zafimaniry is hematite, with a rich iron content. It occurs in the soil in the form of small pebbles and is simply washed preparatory to smelting. If the pieces are more than ¾ inch in diameter, they are broken up with hammers. The furnace is of the simplest sort (Fig. 10, c). A hole 2 to 2½ feet across and 18 inches to 2 feet deep is dug in the hard clay soil, with a sloping groove or trench entering it from one side, to accommodate a pipe leading to a bellows. The air pipe enters the pit 3 to 4 inches above the bottom. Sometimes a rim of clay 3 to 4 inches high is built around the furnace.

The smelting is done with charcoal, made by the ordinary European method. A layer of ignited charcoal is put in the bottom of the pit, then a layer of ore, then more charcoal and more ore until the furnace is filled. Two men work the bellows in shifts, keeping up a steady draft, and more charcoal is added as the mass burns down. The smelting requires about five hours. The molten iron collects in the bottom of the pit forming an ingot called *voromby*. This is drawn out and hammered as soon as it solidifies. Because of the small size of the furnace only a little iron can be smelted at a time. The metal is soft and malleable and the native smiths say that it is much easier to work than European iron.

The bellows employed in smelting and forging is typically Malayan (Fig. 10, a). It consists of two wooden cylinders from

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Canoes are always hewn from green logs, the work proceeding as rapidly as possible, to take advantage of the initial softness of the wood. The outside is roughly shaped with axes and the inside hollowed out through a long slot about one-half the diameter of the log in width. When the sides have been worked to a thickness of 1½ to 2 inches, they are spread until they are nearly vertical. To do this, a row of small fires is kindled along the bottom of the canoe. When they are burning briskly, the cavity is filled with the leaves and stems of a green, succulent plant. The steam from this softens the wood and the sides are gradually opened out by driving in longer and longer thwarts. When the sides have been spread, the canoe, with the thwarts still in place, is weighted and sunk in a stream for a few days until the wood has set. Afterward, the thwarts are removed and the canoe worked smooth inside and out.

The above account was obtained from a member of one of the eastern Tanala gentes. It seems certain that all the Tanala do not spread the sides of their canoes by this method, but I was unable to determine its distribution. Most of my informants had never seen a canoe made.

Sails are unknown. Paddles, like the canoes, are crudely made. The usual type is about 4 feet long with a moderately broad blade, in the form of a pointed oval, and a plain handle. I often saw spades, or even simple sticks, used as paddles in ferrying and there was a taboo against the use of paddles in one of the large rivers in the Menabe territory. This taboo is now ignored but the old people say that while it was in force the crocodiles in this river never attacked people.

TRADE

The Tanala are not a trading people and I doubt whether, even now, there is a single Tanala merchant or shopkeeper. Until relatively recent times the only commerce has been a little barter with the Betsileo for iron implements, silver jewelry and fine cloth and with Europeans for firearms and beads. The government has attempted to establish weekly markets at a few of the principal towns, but has met with little success.

What trade there is, is in the hands of Betsileo and Imerina who have settled in the larger villages. Their stock consists mostly of trinkets and luxuries, the average Tanala family still producing nearly everything it needs. The value of money is thoroughly understood, but most of the trade is still by barter, the Tanala

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437 bringing in various forest products and exchanging them for the merchant's wares.

FOREST PRODUCTS

438 314 The most important articles of trade are beeswax, rubber and raffia. The preparation of the first has already been described. Rubber was formerly an important export, but its value has declined in recent years, due to exhaustion of the wild supply and the low price it brings in competition with cultivated rubber.

314 824 The Tanala were familiar with the properties of rubber in pre-European times, but made little use of it themselves. The only uses I could discover were as a cement and as a material for small, conical tinder boxes. The latter were made only by some gentes of the Ikongo.

Rubber is called *herotra*. The natives divide it into *herotraza*, obtained from trees, and *hero-bahy*, obtained from vines. *Herotraza* is obtained from two trees, the *hero-potsy* and *hero-mena*, literally "white rubber" and "red rubber." The *hero-potsy* is the best. The same methods are used with both species. In one method, the tree is tapped with a series of diagonal cuts and the latex collected in bamboo cups fastened below. It is then poured into a large vessel and coagulated by adding the juice of various acid fruits, *voasarimasy*, *voatrotrokala*, or *voandongoza*.

The other method consists of felling the tree and cutting the trunk into sections 3 to 5 feet long. A section is placed on two wooden horses 18 inches to 2 feet high and a fire kindled underneath. The section is turned constantly, so that all parts will be roasted evenly, and is removed when the bark begins to catch fire. The bark is then stripped off and left in a damp place for eight or ten days. After this, it is pounded in a mortar and washed to free the rubber from dirt and fiber. It is sold in balls which contain a large proportion of impurities.

The *hero-bahy* is obtained from several different vines: *voahentenso*, *voahembory*, *herobanda* and *heromava*. The *herobanda* yields the most latex, but it is hard to coagulate. The *heromava* gives the best grade of rubber. The vines are cut into pieces 1 foot to 18 inches long. These are set upright in bowls or in cups made from the leaves of the Traveler's Palm. Even the roots are dug up and cut into slices to obtain the latex. The rubber is coagulated by boiling it with the juice of acid fruits.

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give success in all possible activities, to bring wealth and to kill enemies. Charms for the family or lineage include those to bring general good fortune, to protect the crops from hail or locusts, to avert sickness, etc. Lastly, each village has its charm or charms which are given to it at the time it is founded and protect it from pestilence or enemy attack or both. 777 789

Most charms are compounds, but there are a few exceptions. A bracelet of thick brass or copper wire (Fig. 23, c) protects the wearer from all sorts of malevolent ghosts and consequently from attacks of vertigo, drowning and, some believe, crocodiles. Vertigo and drowning are thought due to the attack of spirits, while crocodiles may be under spirit control. No magic is connected with the manufacture of these bracelets. They are made by the Imerina and sold by all traders. 777 [438]

Large, roughly spherical beads of translucent white glass, half an inch in diameter, were formerly considered powerful charms to insure general good fortune. They were usually worn attached to a lock of hair (Fig. 22, f). They were the most suitable gift from a man to a beloved wife or child and were highly valued, good examples being worth as much as an ox. At the present time they have largely gone out of use. These beads are not of native manufacture, and their source is unknown. They were probably obtained from the Arabs in early times. The wearing of other beads as charms is not a Tanala custom, but they are gradually coming into use as a result of contact with the plateau tribes. The use of beads as charms reaches its highest development among the Imerina, who distinguish at least fifty different sorts, each with its special magical quality.

A piece of vine which has turned back on itself and grown through the loop, forming a knot, or two twigs which have crossed each other and grown together, make an efficient love charm. It may be cut and used or sold by anyone who finds it. Such charms are never worn openly. [832]

Most charms are compounds. Vegetable substances predominate, but earth, insects, bones, etc., may also be incorporated. The mixture is put in a container of some sort so that it can be readily worn or carried. *Ody zaza* (charms to obtain children) must be done up in cloth and a few other charms are not efficacious unless they are put up in wood. Usually, however, the container does not affect the powers of the charm and its form varies with the fancy of the maker. Most Tanala charms are put up in small, cylindrical

[See category 116, p. 205 - analyst]